

### **REMARKS**

Claims 1-10 and 13-15 are now pending in the application. Claims 1-2 are amended herein. Claims 3-10, 13, and 15 stand withdrawn from consideration. Claims 11-12 are cancelled herein. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### **DRAWINGS**

The drawings stand objected to for certain informalities. In particular, the Examiner states that the "sensitive film" feature must be shown in the drawings or cancelled from the claims. Claims 11-12 are cancelled herein. Applicant submits that these amendments have rendered this objection moot.

### **REJECTION UNDER 35 U.S.C. § 102**

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Goodier (U.S. Pat. No. 4,773,493). This rejection is respectfully traversed.

Applicant notes that the present application is directed toward a mass measurement method and apparatus for detecting mass with a piezoelectric vibration reed and a circuit for exciting such a reed. It is an object of the present application to stably excite a piezoelectric vibration in liquid reed by supplying the reed with a signal from another oscillator (see, e.g., paragraph [0012] of the present application).

Claim 1 calls for a measurement method including "supplying an excitation signal from an excitation circuit including a voltage controlled oscillator to excite the piezoelectric vibration reed". Claim 1 further calls for "calculating a phase difference

between an output signal of the piezoelectric vibration reed and the excitation signal” and “adjusting the excitation signal to have a frequency corresponding to the output signal of the piezoelectric vibration reed in response to the calculated phase difference”.

Applicant submits that Goodier does not disclose the method of claim 1. For example, Goodier discloses an apparatus having two vibratory beams in which a vibration in the first beam results in a vibration 180 degrees out of phase in the second beam and a piezoelectric receiver mounted on the second beam for detecting the vibration of the second beam and feeding back output signals to a piezoelectric driver mounted on the first beam causing the beams to vibrate (see, e.g., column 8, lines 28-45 of the Goodier reference). Goodier does not disclose calculating a phase difference between an excitation signal and an output signal as claimed, much less adjusting the excitation signal in response to the calculated phase difference as claimed. Accordingly, for at least these reasons, Applicant submits that claim 1 is not anticipated by Goodier.

Applicant, therefore, respectfully requests reconsideration and withdrawal of this rejection.

#### **REJECTION UNDER 35 U.S.C. § 103**

Claims 2 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goodier in view of Satoh (U.S. Pat. No. 5,874,866). These rejections are respectfully traversed.

Claim 2 calls for a circuit for exciting a piezoelectric vibration reed including “a voltage controlled oscillator for supplying an excitation signal to the piezoelectric

vibration reed for mass measurement; a phase detection unit for calculating a phase difference between the excitation signal from the voltage controlled oscillator and an output signal from the piezoelectric vibration reed; and a control voltage output unit for supplying a voltage corresponding to the phase difference calculated by the phase detection unit to the voltage controlled oscillator". Claim 2 further recites that "the voltage controlled oscillator adjusts the excitation signal to have a frequency corresponding to the output signal of the piezoelectric vibration reed."

Applicant submits that Goodier and Satoh, alone or in combination, do not disclose or otherwise suggest the circuit of claim 2. The Examiner cites Satoh merely for disclosing an oscillator circuit with a voltage controlled oscillator (see page 5 of the Office Action). Furthermore, as discussed above with regard to claim 1, Applicant submits that Goodier fails to disclose calculating a phase difference between an excitation and an output signal, much less adjusting the frequency of the excitation signal. Therefore, Applicant also submits that Goodier does not disclose a phase detection unit as claimed. Accordingly, for at least these reasons, Applicant submits that claim 2 is not obvious in view of the references.

Claim 14 depends on claim 2 and, therefore, for at least the same reasons, should also be patentable.

Applicant, therefore, respectfully requests reconsideration and withdrawal of this rejection.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Goodier in view of Satoh in further view of Patashnick ( U.S. Pat. No. 4,391,338). Claim

12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Goodier in view of Satoh in further view of Hassel ( U.S. Pat. No. 6,080,939).

Claims 11-12 are cancelled herein. Applicant submits that these amendments have rendered these rejections moot.

### CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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